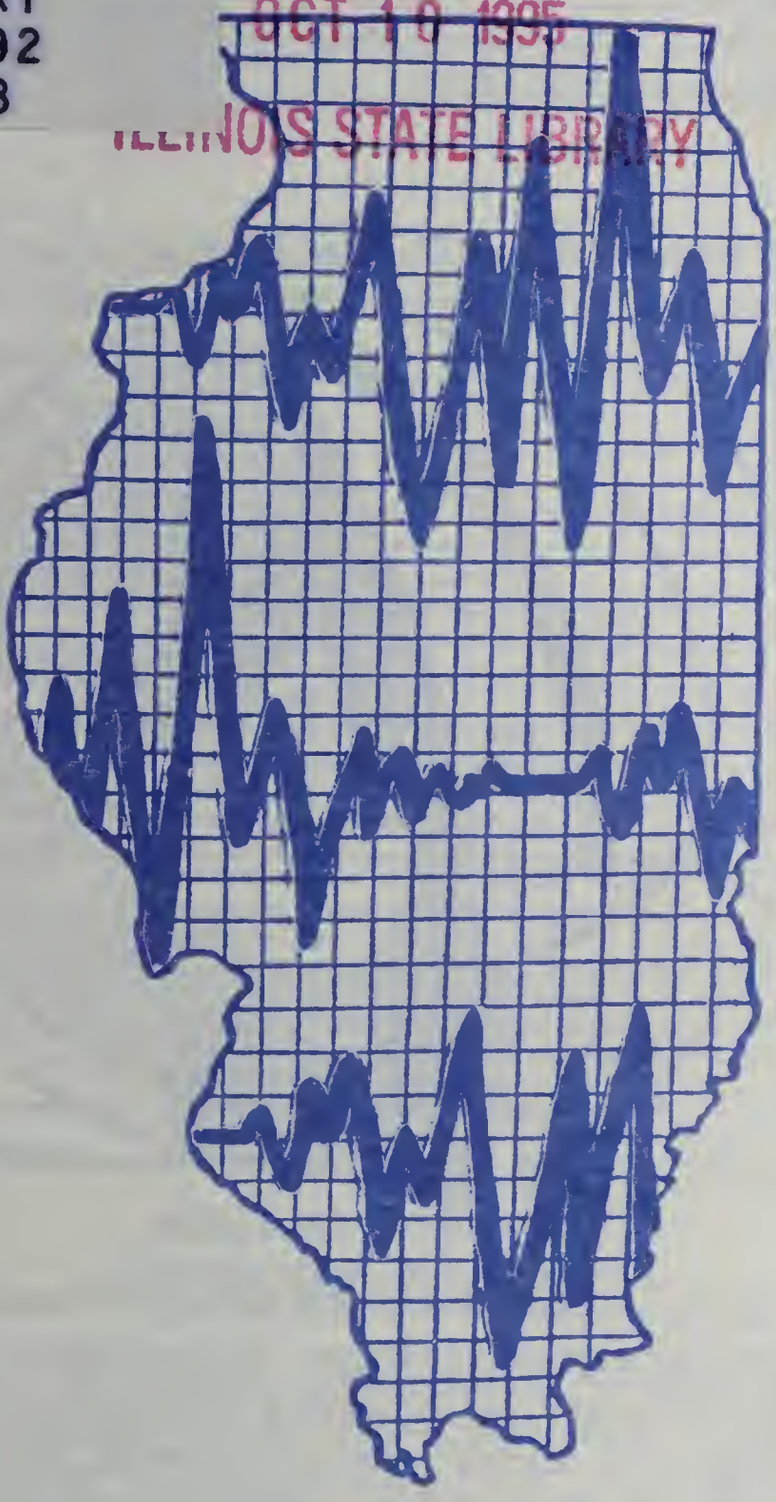
Earthquakes

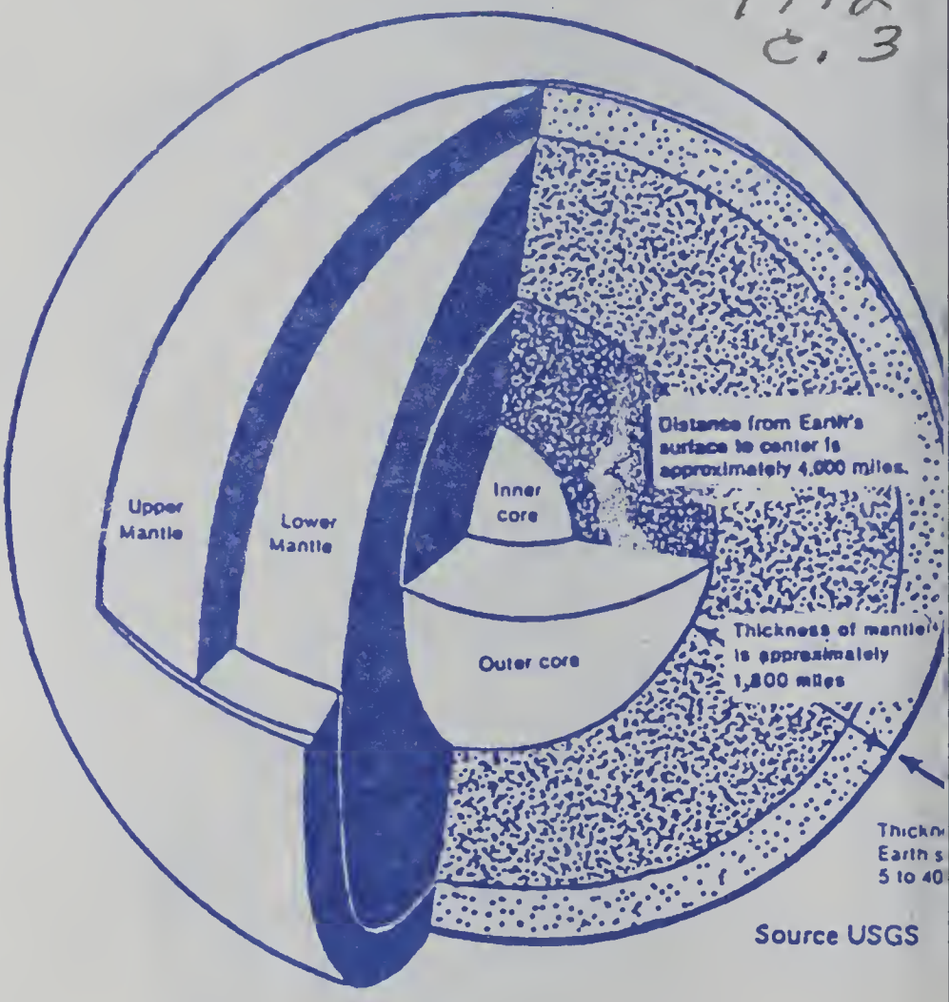


In Illinois

Illinois Emergency Management Agency
110 East Adams Street
Springfield, Illinois 62706

What causes

The Earth is not a solid rock or ball as many people think. The Earth has concentric layers and each layer is very different from the others.



The inner sections of the Earth are very hot because they are under tremendous pressure. The ***inner core*** is thought to be a solid while the ***outer core*** is believed to be a liquid. The ***mantle*** is a thick layer of red-hot rock separating the earth's core from the cooler rock of the ***crust.*** The ***crust*** 'floats' on top of the ***mantle***. The rocks of the crust have many breaks in them along which movement has taken place. These breaks are called ***faults*** and earthquakes often occur along them.

The ***crust*** of the earth is broken up into large 'chunks' called ***plates*** which move very slowly in relation to each other. Some of these ***plates*** become locked together and are unable to slide past each other. This produces a tremendous build-up of energy, just as a twig does if you were trying to break it. When the twig 'snaps' the ***plates*** move and an earthquake occurs.

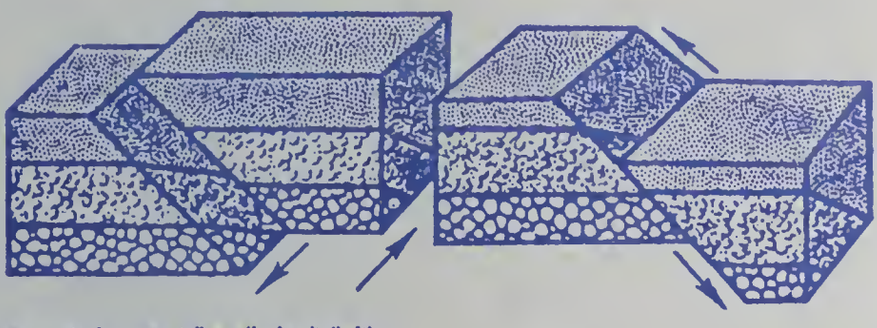
earthquakes

The map below shows where the major ***plates*** of the earth's ***crust*** are located.

Many people know that a large ***fault zone*** can be found in California. This fault zone is called the ***San Andreas Fault Zone.*** It extends for 600 miles and is formed where the ***North American Plate*** and the ***Pacific Plate*** slide past each other. Many earthquakes occur along the ***San Andreas Fault Zone***. These earthquakes can be damaging to property and can cause injury and death as well.

The ***San Andreas Fault Zone*** is not the only fault zone in the United States. There are many others. Some of these fault zones are located within ***plates.*** A major fault zone called the ***New Madrid Fault Zone*** stretches from Southern Illinois to East-Central Arkansas, which is right in the middle of the ***North American Plate.***

The diagram below shows some types of ***fault zones.***

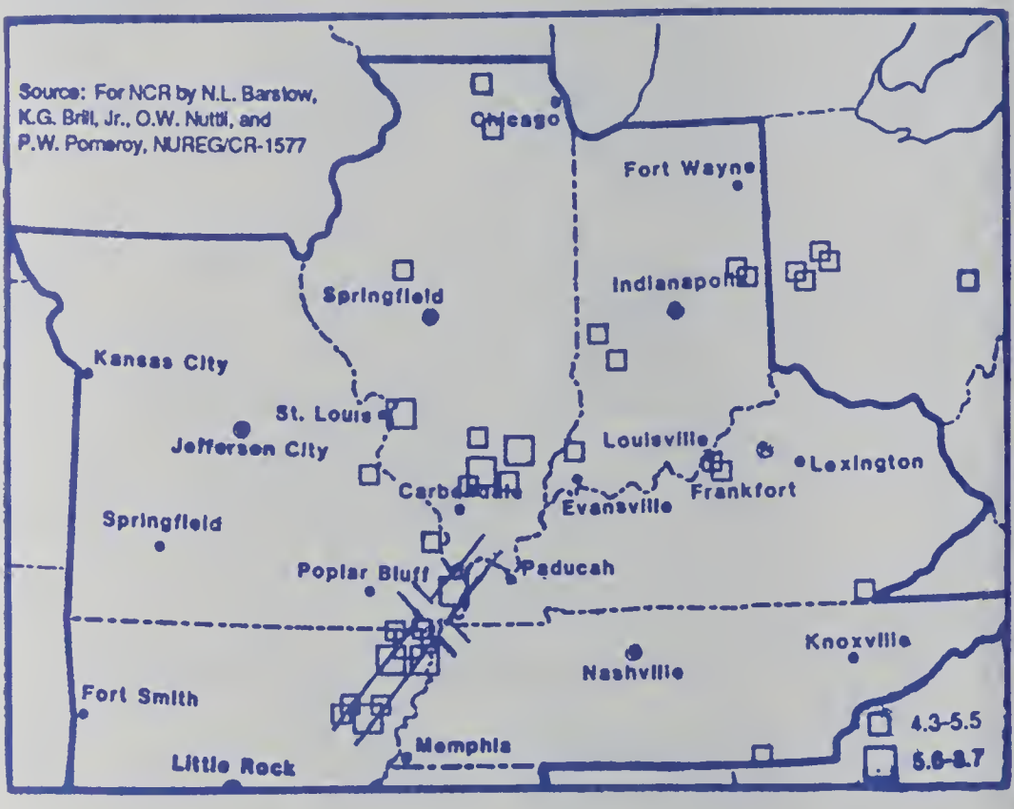


Movement along a strike-slip fault (left).
Movement along dip-slip fault (right).

Source USGS

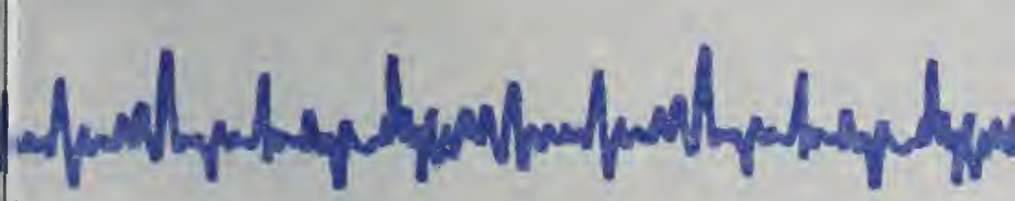
If an earthquake occurred along the ***New Madrid Fault Zone*** today it could cause extensive damage and loss of life in the adjacent states including Illinois.

The lines on the map below show the approximate location of the ***New Madrid Fault Zone.*** The boxes show the location of earthquakes that have occurred along the ***New Madrid Seismic Zone*** and other less prominent seismic zones that are located throughout the Midwestern United States.



Each earthquake starts below the surface of the Earth at a place called the earthquake ***focus.*** The place on the surface of the Earth directly above the focus is called the ***epicenter.*** The earthquake energy is strongest here, and the ***shock waves*** flow out in all directions. The farther away from an earthquake ***epicenter*** a person gets, the weaker the earthquake usually appears to be. The type of rock and soil in the ground determines how well the earthquake ***shock waves*** will travel. In Illinois a variety of rocks and earth material exist. Some of these ***conduct*** earthquake energy easily and even ***intensify*** it; others do not.

Earthquake ***magnitude***, or the amount of energy released by the earthquake, is measured on the ***Richter Scale*** which uses an instrument called a **seismograph**



to record the type and amount of shaking that is actually occurring in the ground. Another scale called the ***Modified Mercalli Intensity Scale*** measures earthquake strength by its affects on people and property in a given area.

A chart showing the ***Modified Mercalli Intensity Scale*** and the ***Richter Scale*** appears below. The two scales are shown on one chart but they are not directly related to each other.

	Intensity	Characteristic effects	Richter Scale magnitude
I	Instrumental	detected only by seismography	
II	Feeble	noticed only by sensitive people	3.5-4.2
III	Slight	like the vibrations due to a passing heavy truck; felt by people at rest, especially on upper floors	
IV	Moderate	felt by people while walking; objects rock, including standing vehicles	
V	Rather strong	felt generally; most sleepers are awakened	4.3-4.8
VI	Strong	trees sway; suspended objects swing; loose objects overturn or fall	4.9-5.4
VII	Very strong	general alarm; walls crack; plaster falls	5.5-6.1
VIII	Destructive	masonry cracks; chimneys fall; poorly constructed buildings damaged; water well levels may change	6.2-6.9
IX	Ruinous	some houses collapse where ground begins to crack; pipes break open	
X	Disastrous	ground cracks badly; many buildings destroyed and railway lines bent; landslides on steep slopes	7.0-7.3
XI	Very disastrous	few buildings remain standing; bridges destroyed; all services (railway, pipes, and cables) out of action; great landslides and floods	7.4-8.1
XII	Catastrophic	total destruction; objects thrown into air; ground rises and falls in waves	8.1+

WHAT TO DO BEFORE AN EARTHQUAKE OCCURS:

Four of the strongest earthquakes in recorded history occurred along the ***New Madrid Fault*** in the Winter of 1811-1812. ***Geologists*** predict that earthquakes can again occur in the ***New Madrid Seismic Zone.*** While these earthquakes may not be as strong as the 1811-1812 earthquakes, they could still be very damaging. Other fault zones in Illinois such as the ***Wabash Valley Fault Zone*** can also produce damaging earthquakes. In 1968 an earthquake produced by this fault system rocked Southern and Central Illinois.

On June 10, 1987 an earthquake ***epicentered*** near Lawrenceville, Illinois produced an earthquake that

measured 5.0 on the ***Richter Scale***. The earthquak
was felt in 18 midwestern states but produced little c
no damage.

While ***seismologists*** cannot predict the exact date c
hour of the recurrence of earthquakes, prior plannin
on the part of citizens can reduce unnecessary injurie
and property damage.

SCHOOL OR WORKPLACE PRECAUTIONS:

* Store heavy objects on lower shelves or store suc
objects on the floor.

* Bolt or fasten bookshelves together for increase
strength and stability.

* Fasten objects to shelving or walls and place protec
tive film over large panes of glass.

* Conduct earthquake drills to help people know wha
to do if an earthquake occurs.

HOME PRECAUTIONS:

* Strap the water heater to a wall
It will be a good source of fresh
water after a disaster.

* Keep a battery powered radio
and flashlight and fresh batterie
in the home.

* Find out how to turn off utilitie
and keep a fire extinguisher in th
home.

* Keep a reasonable supply of
non-perishable food items and
bottled water in the home.

WHAT TO DO
IF AN EARTHQUAKE DOES OCCUR:

If an earthquake does occur, you may notice rattlin
windows, dishes or other objects. Strong earthquake

may cause objects to be thrown about. The ground does not open up and swallow whole neighborhoods as shown in the movies.

The actual ground shaking is seldom the direct cause of death or injury. Most casualties result from falling objects and debris because earthquake shocks can damage or destroy buildings. If you are involved in an actual earthquake, here are a few points to remember:

*** TAKE COVER IMMEDIATELY!**

* If you feel the ground shaking and think that a strong earthquake is starting - don't wait - play it safe!

* If indoors, take cover under a heavy desk or table. If you are in a hallway, support yourself. Avoid doorways and windows. In large areas such as auditoriums or gymnasiums try to take cover by an interior wall. Use your arms and hands to protect your head and neck. Do not run for exits, many injuries occur as people run out of buildings during an earthquake.

* If outdoors, try to find an open area away from powerlines, trees and buildings.

* If you are in an automobile, find a safe place to stop the car and ride the earthquake out. The car's suspension will absorb the earthquake energy.

* The most important thing to remember is to remain calm throughout the earthquake.

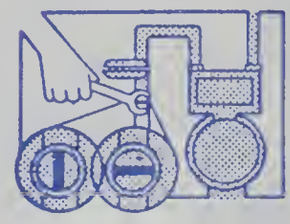
WHAT TO DO AFTER A STRONG EARTHQUAKE OCCURS:

After a strong earthquake occurs there will be a lot of confusion. Try to keep these points in mind:

* The buildings that you are in may have to be evacuated. Aftershocks are tremors which occur after the main shock. These aftershocks may cause additional damage to buildings or the building may even collapse.

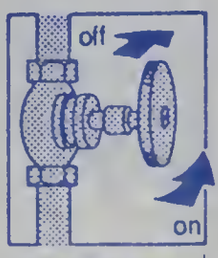
* People may be injured, and you may be called on to help care for the injured. Do not move injured people unless they are in a building in danger of collapse..

* Gas service may need to be turned off after the earthquake if you smell gas. Electrical service should be turned off if structural damage to the building is suspected.



Gas Valve

Pull-Out Cartridge Fuse



Water Valve

* It may be impossible to leave your school or place of employment because of damaged roads or downed power lines. Stay where you are until authorities have determined that it is safe to travel.

Earthquakes are a high risk, low probability event in Illinois. This means that while the chance of an earthquake occurring on a given day is rather small, the damage that the event would cause could be very serious. As with all disasters, it is best to prepare for an earthquake rather than to simply hope that it does not occur. Preparedness may help to save your own life or the life of a friend.

For more information on disaster preparedness, contact:

Illinois Emergency Management Agency
110 East Adams Street
Springfield, Illinois 62706

For more technical information concerning earthquakes contact:

Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820

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